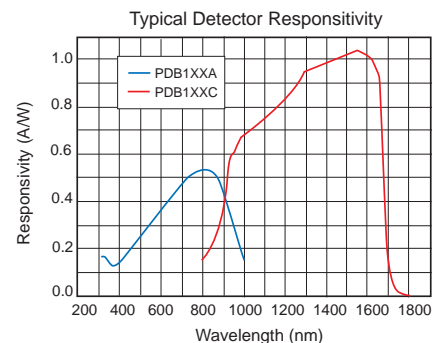


## Fiber-Coupled Balanced Amplified Photodetectors (Page 1 of 2)



### Applications

- Optical Coherence Tomography (OCT)
- THz Detection
- Spectroscopy
- Heterodyne Detection
- LIDAR

### Specifications

- Optical Inputs: \* FC/PC or FC/APC (Removable)
- Photodiode Damage Threshold: 20 mW
- Electrical Outputs: SMA
- RF Output Impedance: 50  $\Omega$
- Size: 85 mm x 80 mm x 30 mm
- Switchable Power Supply Included: 110 VAC, 230 VAC
- Conversion Gain Monitor Output (V/mW):  
10 V/mW at 820 nm for Item Numbers Ending in A or at 1550 nm for Item Numbers Ending in C\*\*

\*For PDB130C models, FC adapter is not removable.

### Introduction

The PDB100 Balanced Detector Series subtracts two input signals from each other, resulting in the cancellation of common mode noise. This allows small changes on the signal path to be extracted from the interfering noise floor. Versions offered include those with bandwidths of DC to 15 MHz, DC to 75 MHz, DC to 100 MHz, and DC to 350 MHz, along with a switchable version (PDB150) with selectable transimpedance gain. Each model is available with either Si (A versions) or InGaAs (C versions) photodiodes. To improve the measurement capabilities in applications where it is desirable to measure a comparably weak frequency modulated signal over a strong CW background signal, an AC-coupled version of the PDB Series is offered.

The PDB100 series of detectors use two balanced photodiodes and an ultra-low noise, high-speed transimpedance amplifier. The design allows an improved matching of the balanced photodetectors to achieve an excellent common mode rejection, leading to better noise reduction. For the PDB140 and PDB145, an additional active filter to suppress aliasing effects is also included.

The detectors have two optical inputs with removable and interchangeable connectors – either FC/PC or FC/APC – for easy adaptation to either fiber-coupled or free-space applications. However, the FC adapter on the PDB130C is not removable.

Three electrical SMA connectors provide the balanced output signal and a power monitor for each of the two input signals. These two monitors make it possible to control the input power levels and can be used as an independent power meter for each channel.

The unit is housed in a shielded, rugged, aluminum enclosure. The housing has an #8-32 and M4 x 0.7 threaded mounting adapter plate that can be positioned by the user so that it is located on either the bottom or the back of the detector. The latter allows the unit to be mounted onto a post by using the included screws and allen wrench. A  $\pm 12$  V DC power supply is included with each unit.



PDB150C

# Fiber-Coupled Balanced Amplified Photodetectors (Page 2 of 2)

## Features

- 320-1700 nm Wavelength Ranges
- Ultra Low Noise
- Direct Detector Monitor Outputs
- Excellent Common Mode Rejection
- Si or InGaAs Detector
- Power Supply Included
- DC to 350 MHz Bandwidth
- Free-Space or Fiber Input (FC/PC or FC/APC)
- Switchable Gain Version Available

ITEM#	PDB140A	PDB140C	PDB145A	PDB145C	PDB120A	PDB120C
Detector Type	Si/PIN	InGaAs/PIN	Si/PIN	InGaAs/PIN	Si/PIN	InGaAs/PIN
Wavelength Range (nm)	320-1000	800-1700	320-1000	800-1700	320-1000	800-1700
Max Responsivity (A/W)	0.53	1.0	0.53	1.0	0.53	1.0
Active Detector Diameter (mm)	0.8	0.3	0.8	0.3	0.8	0.3
Conversion Gain <sup>a</sup> (kV/W)	297	560	27	51	95	180
CW Saturation Power <sup>b</sup> (μW)	12	6.5	130	70	38	20
NEP, Min <sup>b</sup> (pW/√Hz)	5.7	3.2	5.7	3.2	6	3.2
Transimpedance Gain <sup>d</sup> (V/A)	560 x 10 <sup>3</sup>		51 x 10 <sup>3</sup>		180 x 10 <sup>3</sup>	
Bandwidth, 3 dB (MHz)	DC - 15		DC - 15		DC - 75	
CMRR <sup>e</sup>	>35 dB		>35 dB		>35 dB	

<sup>a</sup> Specified for DC to 10 MHz      <sup>b</sup> RF output; specified at 820 nm for A versions and 1550 nm for C versions      <sup>c</sup> Specified for DC to 10 MHz  
<sup>d</sup> Transimpedance Gain is reduced by a factor of two for 50 Ω      <sup>e</sup> Common Mode Rejection Ratio

ITEM#	PDB110A	PDB110C	PDB130A	PDB130C	PDB150A	PDB150C
Detector Type	Si/PIN	InGaAs/PIN	Si/PIN	InGaAs/PIN	Si/PIN	InGaAs/PIN
Wavelength Range (nm)	320-1000	800-1700	320-1000	800-1700	320-1000	800-1700
Max Responsivity (A/W)	0.53	1.0	0.50	1.0	0.53	1.0
Active Detector Diameter (mm)	0.8 mm	0.3 mm	0.4 mm	0.15 mm	0.8 mm	0.3 mm
Conversion Gain <sup>a</sup> (kV/W)	26.5	50	5	10	0.53 - 5,300	1 - 10,000
CW Saturation Power <sup>b</sup> (μW)	130	70	700	400	10,000	5,000
NEP, Min <sup>c</sup> (pW/√Hz)	6.9	3.6	14.7	7.4	0.6	0.3
Transimpedance Gain <sup>d</sup> (V/A)	50 x 10 <sup>3</sup>		10 x 10 <sup>3</sup>		10 <sup>3</sup> , 10 <sup>4</sup> , 10 <sup>5</sup> , 10 <sup>6</sup> , 10 <sup>7</sup>	
Bandwidth, 3 dB (MHz)	DC-100		DC-350		DC-150, 50, 5, 0.3, 0.1	
CMRR <sup>e</sup>	>25 dB (Typical >35 dB)		>20 dB (Typical >25 dB)		>25 dB (Typical >30 dB)	

<sup>a</sup> Specified for DC to 10 MHz      <sup>b</sup> RF output; specified at 820 nm for A versions and 1550 nm for C versions      <sup>c</sup> Specified for DC to 10 MHz  
<sup>d</sup> Transimpedance Gain is reduced by a factor of two for 50 Ω      <sup>e</sup> Common Mode Rejection Ratio

ITEM#	\$	£	€	RMB	DESCRIPTION*
PDB110A	\$ 1,050.00	£ 727.90	€ 932.20	¥ 8,866.30	Balanced Amplified Photodetector, Si, 100 MHz
PDB110C	\$ 1,100.00	£ 762.60	€ 976.60	¥ 9,288.50	Balanced Amplified Photodetector, InGaAs, 100 MHz
PDB120A	\$ 1,176.00	£ 815.30	€ 1,044.10	¥ 9,930.20	Balanced Amplified Photodetector, Si, 75 MHz
PDB120C	\$ 1,260.00	£ 873.50	€ 1,118.70	¥ 10,640.00	Balanced Amplified Photodetector, InGaAs, 75 MHz
PDB130A	\$ 1,344.00	£ 931.70	€ 1,193.30	¥ 11,349.00	Balanced Amplified Photodetector, Si, 350 MHz
PDB130C	\$ 1,440.00	£ 998.30	€ 1,278.50	¥ 12,160.00	Balanced Amplified Photodetector, InGaAs, 350 MHz
PDB140A	\$ 1,276.00	£ 884.60	€ 1,132.90	¥ 10,775.00	Fixed-Gain Balanced Detector, Si, 15 MHz
PDB140C	\$ 1,360.00	£ 942.80	€ 1,207.50	¥ 11,484.00	Fixed-Gain Balanced Detector, InGaAs, 15 MHz
PDB145A	\$ 1,276.00	£ 884.60	€ 1,132.90	¥ 10,775.00	Fixed-Gain Balanced Detector, Si, 15 MHz
PDB145C	\$ 1,360.00	£ 942.80	€ 1,207.50	¥ 11,484.00	Fixed-Gain Balanced Detector, InGaAs, 15 MHz
PDB150A	\$ 1,344.00	£ 931.70	€ 1,193.30	¥ 11,349.00	Balanced Amplified Photodetector, Si, Switchable Gain
PDB150C	\$ 1,440.00	£ 998.30	€ 1,278.50	¥ 12,160.00	Balanced Amplified Photodetector, InGaAs, Switchable Gain

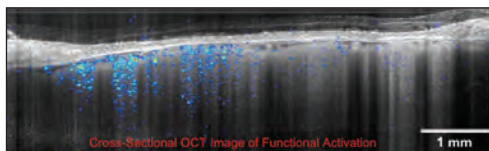
\*Add -AC to the item number for a version with AC-coupling.

## OCT-Proven Balanced Detectors

- Polarization Insensitive (320-100 nm and 800-1700 nm)
- Polarization Sensitive (1270-1350 nm)

See Page 1374

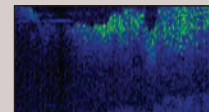
Our OCT-Proven Balanced Detectors are Ideal for Use in OCT Imaging Systems



OCT image of a rat brain superimposed with functional imaging.

Ref: A.D. Aguirre, Y. Chen, J. G. Fujimoto, L. Ruvinskaya, A. Devor, D. A. Boas, Optics Letters, 31(23), 34559-3461 (2006).

Visit our laser imaging web page for up-to-date imaging research and applications:



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